

WHAT IS CLAIMED IS

1 1. A mesh dividing device for performing a mesh dividing
2 process of an analytical target model provided as
3 three-dimensional CAD data into cuboids for
4 numerical-analysis, comprising:

5 a library for previously storing two or more kinds
6 of parameter kits each including a maximum number of
7 cuboids which defines the upper limit of the number
8 of said cuboids and parameters for division-control
9 for dividing said analytical target model into said
10 cuboids;

11 a selecting unit for selecting at least one of said
12 two or more kinds of parameter kits stored in said
13 library; and

14 a mesh dividing unit for performing a mesh dividing
15 process so as to divide said analytical target model,
16 based on a parameter kit selected by said selecting
17 unit (hereinafter referred to selected parameter kit)
18 and said three-dimensional CAD data, into cuboids of
19 less than or equal to the maximum number of cuboids
20 included in said selected parameter kit.

1 2. The mesh dividing device according to claim 1,
2 further comprising a display unit capable of displaying
3 various kinds of information including the contents

4 of said two or more kinds of parameter kits stored in
5 said library, said display unit displaying the contents
6 of said selected parameter kit.

1 3. The mesh dividing device according to claim 2,
2 further a comprising parameter kit designating unit
3 by which the operator designates one of said two or
4 more kinds of parameter kits stored in said library
5 while referring to a display provided by said display
6 unit, wherein said selecting unit selects a parameter
7 kit designated by said parameter kit designating unit
8 to be said selected parameter kit.

1 4. The mesh dividing device according to claim 3,
2 further comprising a modification unit by which said
3 operator modifies the contents of a parameter kit
4 designated by said parameter kit designating unit while
5 referring to a display provided by said display unit,
6 wherein said selecting unit selects a parameter kit
7 modified by said modification unit to be said selected
8 parameter kit.

1 5. The mesh dividing device according to claim 4,
2 further comprising a saving control unit for storing
3 the contents of a parameter kit modified by said
4 modification unit into said library according to an

5 instruction externally given by said operator.

1 6. The mesh dividing device according to claim 2,
2 further comprising a reference component designating
3 unit by which the operator designates a reference
4 component from the components of said analytical target
5 model while referring to a display provided by said
6 display unit, wherein said mesh dividing unit handles
7 said reference component designated by said reference
8 component designating unit, and a component smaller
9 than said reference component, as exception to target
10 for said mesh dividing process.

1 7. The mesh dividing device according to claim 3,
2 further comprising a reference component designating
3 unit by which the operator designates a reference
4 component from the components of said analytical target
5 model while referring to a display provided by said
6 display unit, wherein said mesh dividing unit handles
7 said reference component designated by said reference
8 component designating unit, and a component smaller
9 than said reference component, as exception to target
10 for said mesh dividing process.

1 8. The mesh dividing device according to claim 4,
2 further comprising a reference component designating

3 unit by which the operator designates a reference
4 component from the components of said analytical target
5 model while referring to a display provided by said
6 display unit, wherein said mesh dividing unit handles
7 said reference component designated by said reference
8 component designating unit, and a component smaller
9 than said reference component, as exception to target
10 for said mesh dividing process.

1 9. The mesh dividing device according to claim 5,
2 further comprising a reference component designating
3 unit by which the operator designates a reference
4 component from the components of said analytical target
5 model while referring to a display provided by said
6 display unit, wherein said mesh dividing unit handles
7 said reference component designated by said reference
8 component designating unit, and a component smaller
9 than said reference component, as exception to target
10 for said mesh dividing process.

1 10. The mesh dividing device according to claim 6,
2 wherein said mesh dividing unit handles a component
3 of which at least one of the maximum outer dimensions
4 in the three axial directions is less than or equal
5 to the corresponding one of the maximum outer dimensions
6 in the three axial directions of said reference

7 component, as exception to target for said mesh dividing
8 process.

1 11. The mesh dividing device according to claim 7,
2 wherein said mesh dividing unit handles a component
3 of which at least one of the maximum outer dimensions
4 in the three axial directions is less than or equal
5 to the corresponding one of the maximum outer dimensions
6 in the three axial directions of said reference
7 component, as exception to target for said mesh dividing
8 process.

1 12. The mesh dividing device according to claim 8,
2 wherein said mesh dividing unit handles a component
3 of which at least one of the maximum outer dimensions
4 in the three axial directions is less than or equal
5 to the corresponding one of the maximum outer dimensions
6 in the three axial directions of said reference
7 component, as exception to target for said mesh dividing
8 process.

1 13. The mesh dividing device according to claim 9,
2 wherein said mesh dividing unit handles a component
3 of which at least one of the maximum outer dimensions
4 in the three axial directions is less than or equal
5 to the corresponding one of the maximum outer dimensions

6 in the three axial directions of said reference
7 component, as exception to target for said mesh dividing
8 process.

1 14. The mesh dividing device according to claim 2,
2 wherein said selecting unit automatically selects said
3 selected parameter kit based on said three-dimensional
4 CAD data.

1 15. The mesh dividing device according to claim 14,
2 wherein said selecting unit computes, based on said
3 three-dimensional CAD data, shape-feature information
4 and physical-property-feature information about said
5 analytical target model or components of said
6 analytical target model, and selects a parameter kit
7 corresponding to the computed shape-feature
8 information and physical-property-feature
9 information, to be said selected parameter kit.

1 16. The mesh dividing device according to claim 15,
2 wherein:

3 said library previously classifies and stores said
4 two or more kinds of parameter kits each being brought
5 into correspondence with levels of shape-feature
6 information and physical-property-feature
7 information which are assumed for said analytical

8 target model; and
9 said selecting unit selects a parameter kit
10 corresponding to levels to which the computed
11 shape-feature information and
12 physical-property-feature information belong, to be
13 said selected parameter kit.

1 17. The mesh dividing device according to claim 15,
2 wherein said shape-feature information includes
3 information about the scale of said analytical target
4 model and implementation forms of components in said
5 analytical target model.

1 18. The mesh dividing device according to claim 16,
2 wherein said shape-feature information includes
3 information about the scale of said analytical target
4 model and implementation forms of components in said
5 analytical target model.

1 19. The mesh dividing device according to claim 17,
2 wherein said implementation form is information about
3 volume distribution in said analytical target model.

1 20. The mesh dividing device according to claim 18,
2 wherein said implementation form is information about
3 volume distribution in said analytical target model.

1 21. The mesh dividing device according to claim 15,
2 wherein said physical-property-feature information is
3 information about thermal conductivity distribution
4 in said analytical target model.

1 22. The mesh dividing device according to claim 2,
2 further comprising a conversion time estimating unit
3 for estimating, based on said selected parameter kit,
4 a conversion time required for said mesh dividing unit
5 to perform a mesh dividing process for said analytical
6 target model, wherein said display unit displays said
7 conversion time estimated by said conversion time
8 estimating unit.

1 23. The mesh dividing device according to claim 22,
2 wherein said conversion time estimating unit measures
3 a time required for a simplified mesh dividing process
4 for said analytical target model, the simplified mesh
5 dividing process being performed on the basis of said
6 selected parameter kit, and estimates said conversion
7 time to be a value obtained by multiplying the measured
8 time by a predetermined coefficient.

1 24. The mesh dividing device according to claim 1,
2 wherein said parameters for division-control include
3 the number of the mesh-division in the three axial

4 directions, tolerances in the three axial directions,
5 and a volume conversion rate.

1 25. A computer-readable recording medium in which a
2 mesh dividing program for instructing a computer to
3 function as a mesh dividing device for performing a
4 mesh dividing process to divide an analytical target
5 model provided as three-dimensional CAD data into
6 cuboids for numerical-analysis, wherein
7 said mesh dividing program
8 includes a library for previously storing two or
9 more kinds of parameter kits each including a maximum
10 number of cuboids which defines the upper limit of the
11 number of said cuboids and parameters for
12 division-control for dividing said analytical target
13 model into said cuboids, and
14 instructs said computer to function as
15 a selecting unit for selecting at least one of said
16 two or more kinds of parameter kits stored in said
17 library, and
18 a mesh dividing unit for performing a mesh dividing
19 process so as to divide said analytical target model,
20 based on a parameter kit selected by said selecting
21 unit and said three-dimensional CAD data, into cuboids
22 of less than or equal to the maximum number of cuboids
23 included in said selected parameter kit.

1 26. A method for setting, when performing a mesh
2 dividing process to divide an analytical target model
3 provided as three-dimensional CAD data into said
4 cuboids, a maximum number of cuboids which defines the
5 upper limit of the number of cuboids for
6 numerical-analysis, and parameters for
7 division-control for dividing said analytical target
8 model into said cuboids, comprising the steps of:
9 previously storing two or more kinds of parameter
10 kits, as a library, each including said maximum number
11 of cuboids and said parameters for division-control;
12 selecting at least one of said two or more kinds
13 of parameter kits stored in said library, when
14 performing a mesh dividing process for said analytical
15 target model; and
16 setting a maximum number of cuboids and a parameter
17 for division-control included in the selected
18 parameter kit, on a unit for performing said mesh
19 dividing process.